

WHAT IS CLAIMED IS:

1. A multi-link conveyor chain adapted to provide a substantially flat horizontal surface driveable between a first processing station and a second processing station by engagement with a drive sprocket, said multi-link conveyor chain comprising:

a plurality of elongate pins spaced apart in substantially parallel relationship including a first elongate pin adjacent to a second elongate pin, each of said elongate pins having a first end, a second end and a non-circular section, wherein the first end of each elongate pin extends beyond a first edge of the substantially flat horizontal surface;

a plurality of link plates mounted on adjacent elongate pins having a first link connected to a second link by a connecting portion, each of the first link and the second link having a substantially main body and a circumferentially dependent sprocket engaging member, said main body defining a non-circular aperture whose shape essentially matches the non-circular section of the elongate pin;

a first enclosure member positioned at the first edge of the substantially flat horizontal surface, the first enclosure member comprising a main body having a substantially trapezoidal section and defining a first non-circular aperture and a second non-circular aperture, wherein the shape of the first non-circular aperture and the second non-circular aperture essentially matches the non-circular section of the first elongate pin and second elongate pin respectively and the depth of the first non-circular aperture and the second

non-circular aperture is sufficient to enclose the first end of the first elongate pin and the first end of the second elongate pin respectively; and

means for retaining the first end of the first elongate pin and the first end of the second elongate pin in the first non-circular aperture and the second non-circular aperture respectively.

2. A multi-link conveyor chain as claimed in claim 1, wherein the second end of each elongate pin extends beyond a second edge of the substantially flat horizontal surface and the multi-link conveyor chain further comprises a second enclosure member positioned at the second edge of the substantially flat horizontal surface, the second enclosure member comprising:

a main body having a substantially trapezoidal section and defining a first non-circular aperture and a second non-circular aperture, wherein the shape of the first non-circular aperture and the second non-circular aperture essentially matches the non-circular section of the first elongate pin and the second elongate pin respectively and the depth of the first non-circular aperture and the second non-circular aperture is sufficient to enclose the second end of the first elongate pin and the second end of the second elongate pin respectively; and

means for retaining the second end of the first elongate pin and the second end of the second elongate pin in the first non-circular aperture and the second non-circular aperture respectively.

3. A multi-link conveyor chain as claimed in claim 2, wherein the first enclosure member and second enclosure member are identical.

4. A multi-link conveyor chain as claimed in claim 2, comprising a plurality of the enclosure members positioned at the first and second edges of the substantially flat horizontal surface so as to enclose the first end and the second end of each of the elongate members.

5. A multi-link conveyor chain as claimed in claim 1, wherein the substantially trapezoidal section of the first enclosure member has a first side substantially parallel to a second side, wherein the second side is longer than the first side and has rounded corners.

6. A multi-link conveyor chain as claimed in claim 5, wherein the first side has rounded corners.

7. A multi-link conveyor chain as claimed in claim 1, wherein the means for retaining comprises a first pin head secured to the first end of the first elongate pin and a second pin head secured to the first end of the second elongate pin, said first pin head and the second pin head being seated in counterbores of the first and second non-circular apertures of the first enclosure member respectively.

8. A multi-link conveyor chain as claimed in claim 7, wherein the counterbores are non-tapered.

9. A multi-link conveyor chain as claimed in claim 1, wherein the first enclosure member is sized and configured so as to have a maximum radial extent which is equal to or less than adjacent link plates.

10. A multi-link conveyor chain as claimed in claim 1, wherein the main body of each of the first link and the second link defines a non-circular aperture whose shape non-identically matches the non-circular section of the elongate pin.

11. A multi-link conveyor chain as claimed in claim 1, wherein:  
the plurality of elongate pins further includes a third elongate pin adjacent to the second elongate pin, the third elongate pin having a first end, a second end, and a non-circular section, and

the link plates are consecutively mounted in a staggered fashion along the first, second and third elongate pins.

12. A multi-link conveyor chain as claimed in claim 1, wherein the circumferentially dependent sprocket engaging member of each of the first and second links of the link plate is substantially flat-edged.

13. A multi-link conveyor chain as claimed in claim 12, wherein each of the first and second links of the link plate has a flat-edged, substantially teardrop profile.

14. A multi-link conveyor chain as claimed in claim 1, wherein the non-circular section of the elongate pin is substantially elliptical.

15. A multi-link conveyor chain as claimed in claim 1, wherein the non-circular aperture defined by the main body of the first link is substantially elliptical or oval with an enlarged side portion.

16. A multi-link conveyor chain as claimed in claim 15, wherein the enlarged side portion extends inwardly towards the connecting portion.

17. A multi-link conveyor chain as claimed in claim 1, wherein the link plates are mounted consecutively along one of the elongate pins and are spaced apart by one or more washers.

18. A multi-link conveyor chain as claimed in claim 17, wherein each of the washers comprises a main body defining a non-circular aperture for receiving the elongate pin whose shape essentially matches the non-circular section of the elongate pin.

19. A multi-link conveyor chain as claimed in claim 18, wherein the main body of each of the first link and the second link of the link plate defines a non-circular aperture whose shape non-identically matches the non-circular section of the elongate pin.

20. A multi-link conveyor chain as claimed in claim 18, wherein the non-circular aperture defined by the main body of the one or more washers is an identical match to the non-circular section of the elongate pin.

21. A multi-link conveyor chain as claimed in claim 17, wherein the non-circular aperture of the one or more washers is substantially elliptical or oval.

22. A multi-link conveyor chain as claimed in claim 17, wherein each of the one or more washers comprises a substantially circular main body having one or more circumferential irregularities.

23. A multi-link conveyor chain as claimed in claim 22, wherein each circumferential irregularity extends away from the circumference to a sharp axial edge.

24. A multi-link conveyor chain as claimed in claim 22, wherein each circumferential irregularity is a substantially triangular extension.

25. A multi-link conveyor chain as claimed in claim 22, wherein the one or more washers has a plurality of circumferential irregularities.

26. A multi-link conveyor chain as claimed in claim 22, wherein the substantially circular main body of the washer having one or more circumferential irregularities adopts a non-circular profile.

27. A multi-link conveyor chain as claimed in claim 26, wherein the non-circular profile is a polygonal profile.

28. A multi-link conveyor chain as claimed in claim 17, wherein each of the one or more washers is composed of a heat treatable alloy steel which has a working temperature in excess of 350°C.

29. An enclosure member for a multi-link conveyor chain adapted to provide a substantially flat horizontal surface driveable between a first processing station and a second processing station by engagement with a drive sprocket, the multi-link conveyor chain comprising a plurality of elongate pins and a plurality of link plates, the elongate pins being spaced apart in substantially parallel relationship including a first elongate pin adjacent to a second elongate pin, each of the elongate pins having a first end, a second end and a non-circular section, the first end of each elongate pin extending beyond

a first edge of the substantially flat horizontal surface, the link plates being mounted on adjacent elongate pins having a first link connected to a second link by a connecting portion, each of the first link and the second link having a substantially main body and a circumferentially dependent sprocket engaging member, the main body defining a non-circular aperture whose shape essentially matches the non-circular section of the elongate pin, said enclosure member being positioned at the first edge of the substantially flat horizontal surface and comprising:

a main body having a substantially trapezoidal section and defining a first non-circular aperture and a second non-circular aperture, wherein the shape of the first and second non-circular aperture essentially matches the non-circular section of the first elongate pin and second elongate pin respectively and the depth of the first non-circular aperture and the second non-circular aperture is sufficient to enclose the first end of the first elongate pin and of the second elongate pin respectively,

wherein means is provided for retaining the first end of the first elongate pin and the second elongate pin in the first non-circular aperture and the second non-circular aperture respectively.

30. A method for manufacturing a multi-link conveyor chain as defined in claim 1, comprising the steps of:

(A) securing a first pin head to the first end of an elongate pin;



(B) inserting the second end of the elongate pin into the first non-circular aperture defined by the main body of the first enclosure member;

(C) inserting the second end of the elongate pin into the non-circular aperture defined by the first or second link of each of a plurality of link plates to a position where the first pin head is enclosed within the first non-circular aperture defined by the main body of the first enclosure member; and

(D) securing a second pin head to the second end of the elongate pin.

31. A method as claimed in claim 30, wherein steps (A) and (D) are carried out by spin riveting.

32. A method as claimed in claim 30, wherein in step (C) the second end of the elongate pin is inserted to a position where the first pin head is seated in a counterbore in the first non-circular aperture.

33. A method as claimed in claim 32 further comprising:

(E) inserting the second end of the elongate pin into the first non-circular aperture defined by the main body of the second enclosure member to a position where the second end is enclosed within the first non-circular aperture; and

(F) eccentrically spin riveting a piece of material onto the second end of the elongate pin to produce a second pin head.

34. A method as claimed in claim 33, wherein in step (E) the elongate pin is inserted to a position in which the second end is adjacent a counterbore.

35. A method as claimed in claim 33, wherein step (F) produces a second pin head seated in the counterbore.

36. A method as claimed in claim 33, wherein the piece of material is greater in diameter than the desired diameter of the second pin head.

37. A method as claimed in claim 36, wherein the second pin head is oval and the desired diameter is the length of the major axis.